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For: AN ELECTRICALLY ACTIVE TEXTILE ARTICLE

- 1 1. An electrically active textile article comprising:
2 fabric;
3 a circuit including traces and pads on a substrate secured to the
4 fabric; and
5 at least one electronic component populating the circuit.

- 1 2. The article of claim 1 in which the substrate is flexible.

- 1 3. The article of claim 1 in which the traces and pads are electrically
2 conductive.

- 1 4. The article of claim 1 in which the circuit substrate is ultrasonically
2 welded to the fabric.

- 1 5. The article of claim 4 in which the circuit substrate is ultrasonically
2 welded to the fabric about the periphery of the substrate.

- 1 6. The article of claim 1 in which the circuit substrate includes a perimeter
2 bond area devoid of traces and pads and the perimeter bond area is secured to the fabric.

1 7. The article of claim 1 in which an adhesive secures the substrate to the
2 fabric.

1 8. The article of claim 1 in which threads secure the substrate to the fabric.

1 9. The article of claim 1 further including a protective covering over the
2 circuit.

1 10. The article of claim 9 in which the protective covering is made of a
2 waterproof material.

1 11. The article of claim 9 in which the protective covering extends onto the
2 fabric.

1 12. The article of claim 3 in which the substrate is a thermoplastic material
2 and the conductive traces and pads are metal.

1 13. The article of claim 1 in which the fabric is selected from the group
2 consisting of woven, knit, non-woven, and braided fabrics.

1 14. The article of claim 13 in which the fabric is a portion of a wearable
2 article.

1 15. The article of claim 1 further including stress relief areas which promote
2 flexure of the circuit substrate.

1 16. The article of claim 15 in which the stress relief areas are cut-outs in the
2 edges of the substrate.

1 17. The article of claim 15 in which the stress relief areas are cut-outs through
2 the substrate.

1 18. The article of claim 15 in which the stress relief areas include material
2 added to the substrate.

1 19. The article of claim 15 in which the stress relief areas are located between
2 electronic components on the circuit.

1 20. The article of claim 1 in which there are two flex circuits secured to the
2 fabric and electrical interconnections between the two flex circuits.

1 21. The article of claim 20 in which the two flex circuits are secured to the
2 fabric by at least one zipper including at least two electrically conductive teeth for the
3 electrical interconnections.

1 22. The article of claim 20 in which the two flex circuits are secured to the
2 fabric by at least one pair of VELCRO[®] patches with at least a portion of the patches
3 being an electrically conductive material for the electrical interconnections.

1 23. The article of claim 20 in which the two flex circuits include conductive
2 solder pads and the fabric includes polyester-coated copper fabric, the conductive solder
3 pads and the polyester coating being melted to form the electrical interconnections.

1 24. An electrically active textile article comprising:
2 an article of clothing;
3 a flex circuit including conductive traces and pads on a flexible
4 substrate secured to the article of clothing;
5 at least one electronic component populating the flex circuit; and
6 a protective covering over the flex circuit and the at least one
7 electronic component.

1 25. An electrically active textile article comprising:
2 fabric;
3 a flex circuit including conductive traces and pads on a flexible
4 substrate secured to the fabric, the flex circuit including stress relief areas to promote
5 flexure of the flex circuit on the fabric;
6 at least one electronic component populating the flex circuit; and
7 a protective covering over the flex circuit and the at least one
8 electronic component.

1 26. An electrically active textile article comprising:
2 fabric;
3 a flex circuit including conductive traces and pads on a flexible
4 substrate;
5 at least one electronic component populating the flex circuit; and
6 a covering secured to the fabric over the flex circuit and the at least
7 one electronic component, wherein the flex circuit is in pressed engagement with the
8 fabric and the covering.